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ABSTRACT

Long distance, or wide area, computer networking can change teaching and learning dramatically. Teachers and students with access to a computer, a modem, and phone lines are freed from the physical limits of a school building and time schedules. They can communication with peers and gain access to electronic resources, making individualized instruction and personal inquiry the norm. Network users can undertake three primary activities: electronic mail, computer conferencing, and accessing information from remote sources. Electronic mail enables teachers and learners to exchange information locally and worldwide. Network communication also makes it easy for groups of people to work cooperatively and share information without having to be in close physical proximity. Examples of information from remote sources available to students include research data and services related to drug and alcohol abuse from California's Drug and Alcohol Abuse Prevention Net, text of Supreme Court decisions, information on space flights and space science, and the full text of selected books through Project Gutenberg. User manuals, classes, and general reference works can help users master the basics of networking, including how to operate the computer, modem, and telecommunications software; how to connect to and communicate with a computer already linked to the network; and how to use the network to communicate with others. Finding a network with which to connect is not always easy. Options include local bulletin board systems, college and university systems, statewide and regional systems, school computer facilities, and commercial vendors. Brief descriptions and contact information for six network resources are included. (Contains 10 references.) (KRN)

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NETWORKING: K-12

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Networking: K-12

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Introduction

At-risk high school students in the states of Washington, Texas, Massachusetts, and California "meet" online to discuss teenage pregnancy, drug prevention, Middle East foreign policy, and other topics of current interest (Jensen, 1991/92).

Students of all ages collaboratively produce a newspaper, Global Village News, *using input from dozens of worldwide student "news bureaus" linked through more than 15,000 free computer bulletin boards in over 50 countries. The paper is distributed to thousands of users throughout the world* (Rose, 1992).

Students from the United States and other countries go on a simulated space shuttle journey, assuming various roles including secondary mission control, selecting alternative landing sites and docking other shuttles (Clement, 1992).

What makes these common educational experiences exciting and unique? They all involve students and teachers from around the world interacting through computer networks.

The Benefits of Networking

Long-distance, or wide-area, computer networking can change teaching and learning dramatically. Teachers and students with access to a computer, a modem, and phone lines are freed from the physical limits of a school building and the time limits of an 8 a.m. to 3 p.m. school day. They can communicate with peers and gain access to electronic resources as they wish, making individualized instruction and personal inquiry the norm, not the exception. Interaction through networks helps break down communication barriers and inhibitions that often stifle the open exchange of ideas in traditional classrooms. There is also a strong motivational aspect to network use: kids bring an energy and enthusiasm to it that's often missing in traditional classrooms, and teachers are thrilled to be able to share ideas, problems, and solutions with colleagues across the country as easily as if they were next door.

The excitement and enthusiasm for networking is not wistful speculation based on theoretical possibilities—it's happening right now. Thousands of students and teachers are tapping into networks, sharing experiences, and engaging in a wide range of learning activities. As the pace of networking accelerates, so too will the creative uses and the overall impact of the movement.

How Are Networks Used?

Whether connected to a state, regional, or private network, or to the Internet (the worldwide "network of networks"), network users can undertake three primary activities: electronic mail, computer conferencing, and accessing information from remote sources. Each of these offers opportunities to expand the learning environment, foster better communication, and excite learners and educators.

Electronic Mail (or E-Mail). Using e-mail, learners can exchange information with teachers or other learners, and teachers can communicate with students or colleagues, locally and worldwide. E-mail messages offer immediate access to others on the same network.

- Teachers, administrators, librarians, and other educators can consult with colleagues in the district and across the country on curriculum, policies, technology, and other concerns.
- Students can "talk" to others across time zones and continents and get responses much more quickly than by mail.
- Texts, or files, can be transferred through e-mail, facilitating the exchange of papers, reports, and resource materials for teachers, administrators, and students.

Group Communication. Network communication also makes it easy for groups of people to work cooperatively and share information without having to be in close physical proximity. It is possible to create "global classrooms" where students work with others as if they were in the same location. Educators and students can join organized discussion groups on specific topics. The networks are filled with hundreds of such groups (sometimes called "listservs"), many having international membership. LM_NET, for example, is an Internet discussion group for the library media field; EDTECH-L is dedicated to educational technology.

Remote Information Access. Through computer networking, information from around the world becomes available in the local school and even in the individual classroom or library media center. A few examples of the wealth of information available to students include:

- Research data, discussions, libraries, and additional services related to drug and alcohol abuse from California's Drug and Alcohol Abuse Prevention Net.
- Text and commentaries of Supreme Court decisions, information on space flights and space science, and data from the U.S. Commerce Department through the Cleveland Free-Net.
- The full text of the Federalist Papers, the U.S. Constitution, the Koran, and a host of other books through Project Gutenberg, a non-profit organization seeking to prepare electronic editions of more than 10,000 books by the year 2001.

Getting Started

To get into wide area networking, you need to know: (1) how to operate your own computer, modem, and telecommunications software; (2) how to connect to and communicate with a computer already linked to the network; and (3) how to use the network to communicate with others. User manuals, classes, and general ref-

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erence books (for example, Roberts, 1990; Glossbrenner, 1989) can help you master these basics.

Finding a connection to a computer on a network is not always an easy task. Options include:

- Local bulletin board systems (bbs). Telephone dial-up to a local bulletin board is a readily available and generally free connection to a computer network. Computer stores, the public library, education agencies, or computing centers at local colleges should be able to provide information about bulletin boards in your area.
- College and university computer systems. Most colleges and universities provide free or low-cost accounts on their computer systems to all students. These systems usually connect to BITNET or some other network that in turn provides access to the Internet. Educators who are enrolled in college or university courses should inquire about network access.
- Statewide and regional systems. A growing number of states, including Texas, Virginia, Florida, and North Dakota, provide low-cost or free connections to schools and/or teachers, administrators, and students within the state. These networks generally provide some statewide services (e.g., bulletin boards, conferencing, curriculum resources sharing, administrative data transfer) as well as a gateway to the Internet and other networks. In addition, some of the National Science Foundation mid-level and regional networks are providing fee-based access to the Internet. Contact state education agencies for information.
- School computing facilities. Local schools and districts are just beginning to develop wide area network capabilities. Check with your building or district computer support personnel to see what is available to you.
- Commercial vendors. Commercial vendors provide a wide range of fee-based information resources and services, including electronic mail and messaging. Many of the commercial systems offer, or intend to offer, connections to the Internet (See Notess, 1992 for list).

Selected K-12 Network Resources

Academy One. Affiliated with the National Public Telecomputing Network (NPTN) and the Cleveland Free-Net, this program aims to create a "national online information cooperative for K-12 telecomputing activities." Schools throughout the world access the resources of Academy One's community computer systems and participate in a variety of online projects and events. Contact: Linda Delzeit, NPTN Director of Education, Box 1987, Cleveland, OH 44106; (216) 368-2733. Internet: AA002@NPTN.ORG.

AppleLink. This official online information resource of the Apple Computer community offers a K-12 Education Area with discussion forums, software reviews, conference listings, lesson plans, and research results. Contact: Lisa Bauer, Mail Stop 41-D, Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.

Commercial Vendors. Following are some of the many commercial networks offering some resources and services specifically for education: **America Online**, 8619 Westwood Center Drive, Vienna, VA 22182, 800-827-6364. **America Tomorrow**, P.O. Box 2310, W. Bethesda, MD 20827-2310, 800-456-8881. **GTE Education Services**, West Airfield Drive, P.O. Box 619810, D/FW Airport, TX 75261-9810, 800-927-3000.

FrEdMail. The "Free Educational Mail Network," the oldest and largest educational network in the U.S., uses the Internet to link more than 150 electronic bulletin boards operated by individuals and institutions. (See Rogers, 1992). FrEdMail offers collaborative activities designed to help students become better writers and learners. It also promotes the sharing of resources and experiences among teachers. For information on finding a local node or setting up your own electronic mail center, contact: Al Rogers, FrEdMail Foundation, P.O. Box 243, Bonita, CA 91908; (619) 475-4852. Internet: AROGERS@BONITA.CERF.FRED.ORG.

K12Net. This bulletin board-based system works through "echo" forums around major curriculum areas for teachers and students interested in particular topics. These forums facilitate cooperative projects such as *Global Village News* (see opening). Access to K12Net is through **FidoNet**, a free general-interest computer network that joins more than 15,000 computer bulletin boards in over 50 countries. Participation is free to anyone with local bulletin board access. To find active bulletin boards in your region, call a local computer store or your public library (Rose, 1992).

KIDSNET. Accessible through the Internet, KIDSNET is a global discussion group for teachers and others interested in networking for children and education. (See Join KIDSNET!, 1991.) Participants discuss general questions regarding computer networking and user interfaces, and specific projects that link teachers and students using the Internet. KIDS is an associated list just for children. To subscribe to KIDSNET, send an Internet request to: JOINKIDS@PITTVMS.BITNET. Children with access to the Internet can post messages to KIDS by sending mail to: KIDS@PITTVMS.BITNET

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